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QUARTERLY REPORT Project WP#339: Structural Significance of Mechanical Damage

For Period Ending: February 28, 2010

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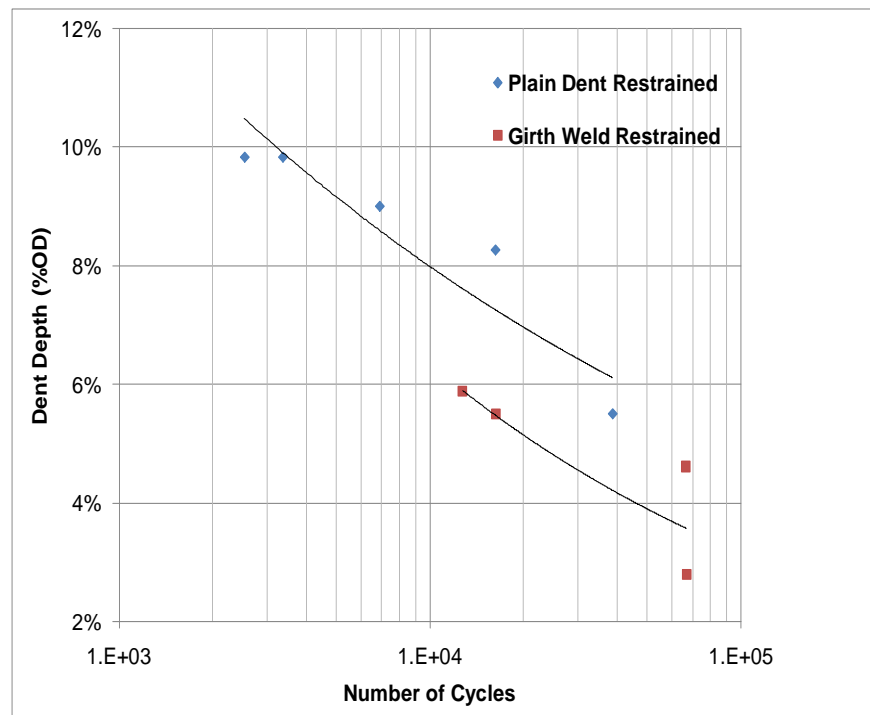
Project WP#339: Structural Significance of Mechanical Damage

Background

The primary objective of the project is to establish a detailed experimental database to support the development and validation of improved burst and fatigue strength models for assessing the interaction of mechanical damage with secondary features (gouges, corrosion, and welds). The data will be used to develop and validate mechanistic models which will produce reliable tools to assess a wide range of mechanical damage forms. This will improve safety, reduce unnecessary maintenance, and support the improvement of pipeline standards and codes of practice.

Progress in the Quarter



BMT has completed the testing of dents interacting with girth welds. A comparison of the fatigue lives for girth welds and for plain dents is presented in the figure below.



The final test matrix for dents interacting with simulated corrosion features has been presented to the project team. Fabrication and testing of the simulated corrosion features will begin in the coming quarter.

The table below summarizes the progress of the task on “Dent and Gouge” defects for the entire program. The background color in the table represents:

- White: Defects not yet created
- Yellow: Defects already created but not yet investigated or submitted to either Burst or Fatigue tests
- Green: Defects created and tests completed

MD 4-1				
Pipe 1 (current steel X52)			Pipe 2 (current steel X70)	
Type 1	Type 2	Type 3	Type 1 or 2	Type 2 or 3
 Defect 1.1.1b	 Defect 1.2.1b	 Defect 1.3.1	 Defect 2.1.1	 Defect 2.2.1
 Defect 1.1.2	 Defect 1.2.2	 Defect 1.3.2	 Defect 2.1.2	 Defect 2.2.2
 Defect 1.1.3	 Defect 1.2.3	Defect 1.3.3	 Defect 2.1.3	Defect 2.2.3

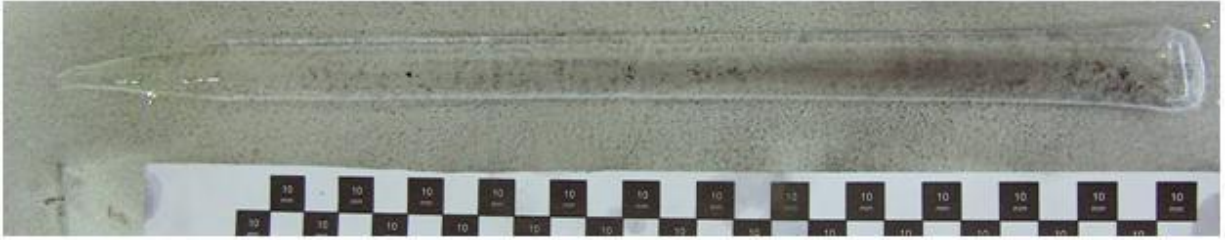
GDF SUEZ continued the materials characterization and the tests on dents and gouges during this reporting period with the following results:

- The cyclic hardening tests in transverse direction for materials Pipe 1 and Pipe 2 show a Bauschinger effect with softening behavior for both materials
- Defects 1.3.2 and 2.2.2 were created with slower aggression and low internal pressure, respectively 30 and 20 bars to promote deep denting in the range of 5% and 6% (defect shown below)



Side View of Defect 1.3.2

Magnetic particle inspection (MPI) did not reveal the presence of cracks or micro-cracks at the bottom of the gouge for either defects.



Defect 2.2.2

These test samples will be used for burst testing. Testing will be conducted during the next quarterly period.

A contract modification request had previously been submitted to PHMSA in August 2009 regarding the vintage pipe manufacture and has been under review by PHMSA since that time. Based on the adjustment regarding the sources for vintage pipe, a revised version of the modification request was prepared and issued to PHMSA in February 2010. The revised modification includes the acquisition and characterization of vintage pipe using former in-service pipes. Preliminary material characterization test are being planned at this time and will be initiated upon approval of the revised contract modification request.